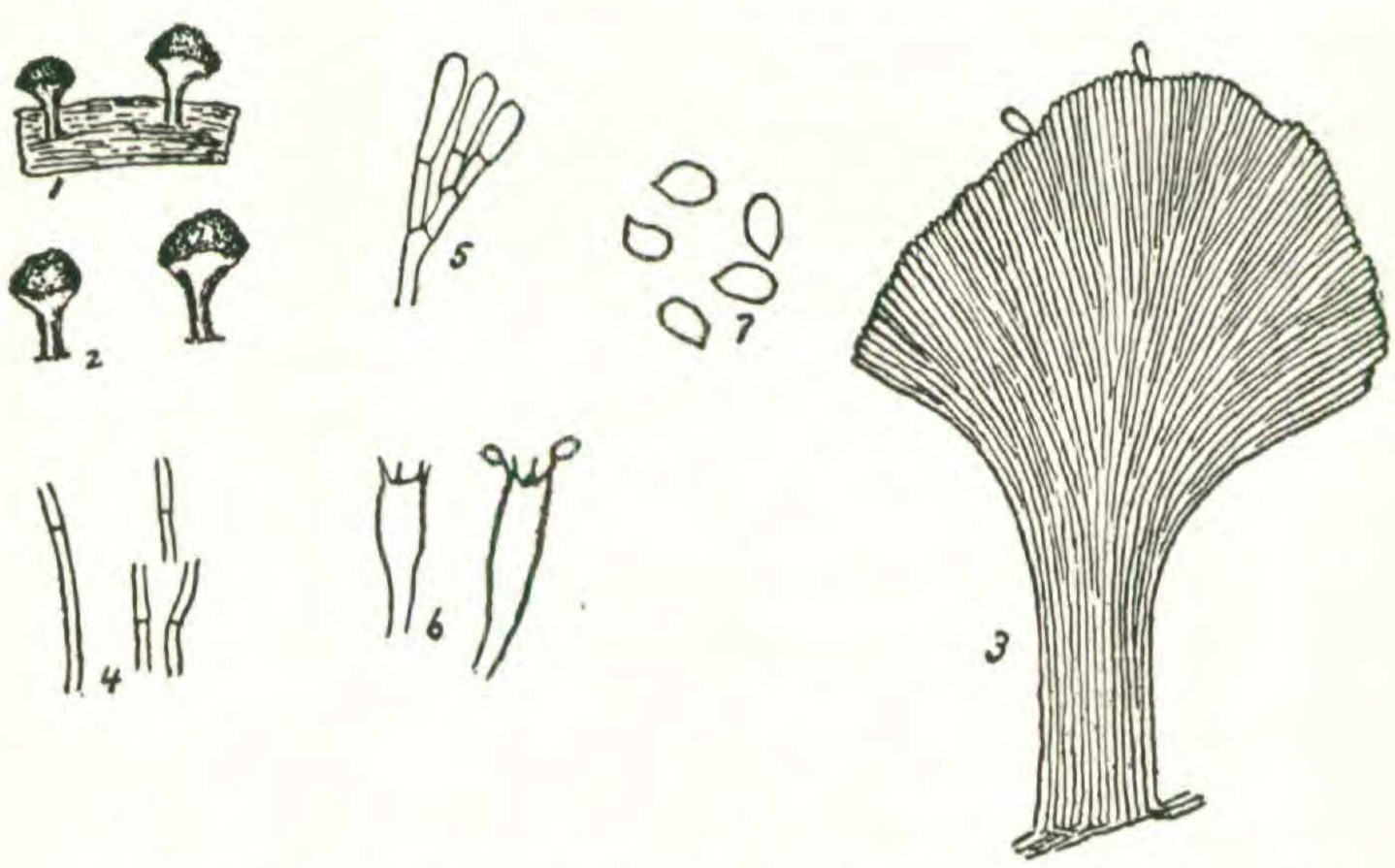
wood; in fig. 2 the same fructifications are shown after being removed from the wood and mounted in water.

The structure of the fructification is shown by the higher magnification of fig. 3. From a layer of hyphae at or near the surface of the substratum, hyphae start out together at right angles to the substratum and are closely joined in a



Pistillaria Thaxteri: 1, two fructifications in dried condition on wood, ×63; 2, the same fructifications in an aqueous mount, ×63; 3, median longitudinal optical section of a fructification, ×380; 4, hyphae, showing absence of clamp connections, ×640; 5, cluster of young basidia, ×640; 6, two basidia with sterigmata, ×640; 7, five basidiospores, ×640.

cylindric column about 60 μ long and 20–40 μ in diameter in the dried specimens, swelling to 25–50, and rarely 80 μ, in diameter when the specimens are wet, treated with potassium hydrate or lactic acid, and mounted in microscopical preparations. These hyphae are hyaline, thin-walled, about $1\frac{3}{4}$–2 μ in diameter, and not incrusted nor nodose-septate (fig. 4). At the outer end of the stem the hyphae pass into the pileus which is distinguishable from the stem by its obversely conical form, as shown under a magnification of 380 diameters in fig. 3. The obconical form of the pileus is due to repeated branching of its hyphae as they extend directly from the stem to the surface of the pileus. The manner of branching and of increase in diameter of the pileus is shown in figs. 3 and 5. At the outer peripheral end the terminal cell of each hyphal branch becomes swollen with pro-

toplasmic contents and differentiates into a simple basidium somewhat clavate in form, 13–17×4–4½ μ, when fully mature, which bears four spores upon short sterigmata (figs. 5 and 6). The spores are hyaline, even, slightly flattened on one side, pointed at the base, 5–9×3½ μ (fig. 7). No cystidia, hairs, or organs other than basidia have been found in the hymenium.

This fungus is remarkable not only for its minute size—and it is by far the smallest known species of the toadstool kind—but also for its extreme simplicity of structure. A few hyphae extend out together in a compact bundle from the vegetative mycelium, and at a little distance from the substratum simply branch and terminate in basidia bearing the usual basidiospores. No additional accessory, supporting, or secretory organs of any kind are differentiated, nor is there any perceptible differentiation into cortical and medullary regions in the fructification, nor any curvature of the fertile hyphae so that the basidia will be directed towards special cavities or towards the substratum; on the contrary, the whole fructification is as simple as a sheaf of wheat. A few hyphae stand out together from the substratum — probably for mutual support—and produce as simply and directly as possible their complement of basidia and basidiospores, and form both distinct stem and pileus of the simplest possible structure. The primordium of the pileus in its ontogeny in more highly developed species is not simpler.

Quelet[1] published under the name *Pistillina hyalina* Quelet, n. gen. and sp. the description of a fungus closely related to the American species which I am describing. *P. hyalina* is ten times as large as our fungus, clearly visible to the naked eye, and has elongated, aculeate spores. Quelet's genus *Pistillina* is regarded as a subgenus under *Pistillaria* of the *Clavariaceae* by Saccardo.[2] While *Pistillina* appears to be a needed genus for such species as that for which it was founded and for the present American species, still the few species

[1] Champ. Jura et Vosges, Suppl. 10, Assoc. Fr. Avanc. Sci. **9**: 671. *pl. 8. f. 12.* 1880.

[2] Syll. Fung. **6**: 759. 1888.

which would be clearly comprehended by it would be connected with the usual elongated forms of *Pistillaria* by some intermediate species found in Europe, where the species of *Pistillaria* appear to be more numerous and more frequent than in North America.

The present American species may be characterized as follows:

Pistillaria (subgen. **Pistillina**) **Thaxteri** Burt, n. sp.

Fructifications gregarious, pileate, erect, drying whitish to cartridge-buff; pileus hemispherical, puberulent, attenuated at the base into a cylindric stem composed of hyaline, thin-walled, even-walled, parallel hyphae about $1\frac{3}{4}$–2 μ in diameter, not nodose-septate, not incrusted; basidia simple, subclavate, 13–17$\times$4–$4\frac{1}{2}$ μ, with four sterigmata; spores hyaline, even, flattened on one side, pointed at the base, 5–9$\times$$3\frac{1}{2}$–$4\frac{1}{2}$ μ; no cystidia nor paraphyses.

Fructification 100–110 μ high; pileus 50–110 μ in diameter, 40–50 μ long; stem about 60 μ long, 20–50 μ, rarely 80 μ, in diameter.

On rotten wood, West Haven, Connecticut, November 7, 1888, *R. Thaxter,* type (in Farlow Herb. and Mo. Bot. Gard. Herb., 5724).

The fructifications are but a fraction of the size of those of any other species of the genus and not visible to the naked eye.

A NOTE ON THE ADAPTABILITY OF THE FOLIN MICRO-KJELDAHL APPARATUS FOR PLANT WORK

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There is frequent need in most botanical laboratories for the determination of small amounts of nitrogen. Recourse is usually had to the familiar Kjeldahl method—a method, however, which proves rather cumbersome for certain types of work.

Within recent years Folin and Farmer[1] of the Harvard Medical School have modified the original Kjeldahl method to the end of determining small amounts of urea nitrogen. In their investigations they found the method approached the original in accuracy, while in economy of material to be analyzed, in reagents, and in time for determination, it was superior.

The Folin modification has been given an extended trial in this laboratory, and with a few modifications has been found admirably adapted to many phases of plant work. It is especially good for demonstration of proteolytic changes, since the determination of nitrogen in the different protein fractions can be readily made. The nitrogen content of minute plant sections or organs can be determined—as well as the effect of light, darkness, nutrition, disease, etc., upon the nitrogen content of various plant parts. The method is also adapted for work with advanced classes in plant physiology, the apparatus being easily set up, and requiring but little desk space and no hood; at the same time it is inexpensive to install.

Apparatus.—The essential parts of the apparatus are as follows:

1. Kjeldahl flasks of 100 or 200 cc. capacity;
2. Folin fume absorbers;[2]

[1] Folin, O., and Farmer, C. J. A new method for the determination of total nitrogen in urine. Jour. Biol. Chem. **11**: 493–501. 1912.

[2] These can be obtained at most laboratory supply houses.